

Application of Single-Walled Carbon Nanotubes/Au Nanosol Modified Electrode for the Electrochemical Determination of Esculetin in *Cortex Fraxini*

Yuanyuan Yao^{1, 2}, Xiaomei Zhang¹, Na Li¹, Xuming Liang¹, Yangping Wen^{2, 3}, Hui Zhang^{2, 3}, Yilong Chen¹, Dajian Yang^{1,*}, and Jingkun Xu^{2,*}

¹ Chongqing Academy of Chinese Materia Medica, Chongqing 400065, P. R. China

² School of Pharmacy, Jiangxi Science and Technology Normal University, Nanchang 330013, PR China

³ Key Laboratory of Applied Chemistry, Jiangxi Agricultural University, Nanchang 330045, PR China

*E-mail: yangdajian@foxmail.com, xujingkun@tsinghua.org.cn

doi: 10.20964/2016.07.59

Received: 15 April 2016 / Accepted: 19 May 2016 / Published: 4 June 2016

A novel simple, sensitive and selective electrochemical sensor was successfully prepared for the determination of esculetin in *Cortex Fraxini* based on the carboxylic acid-functionalized single-walled carbon nanotubes-Nafion–Au nanosol nanocomposite modified glassy carbon electrode (c-SWCNTs-NF–AuNs/GCE). Scanning electron microscopy, energy dispersive X-ray spectroscopy, electrochemical impedance spectroscopy and cyclic voltammetry were carried out to characterize the properties of c-SWCNTs-NF–AuNs nanocomposite. Owing to the synergistic effects of large surface area, superior electrical conductivity, and large amount of chemically active sites of c-SWCNTs, together with the good biocompatibility and high conductivity of AuNs, the c-SWCNTs-NF–AuNs/GCE exhibited a good electrocatalytic activity to esculetin with wide linear range of 0.004–55 μ M and low detection limit of 0.12 nM. Additionally, the modified electrode was employed for analysis of esculetin in *Cortex Fraxini* with satisfactory results.

Keywords: Electrochemical determination; Differential pulse voltammetry; Single-walled carbon nanotube; Au nanosol; Esculetin;

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).